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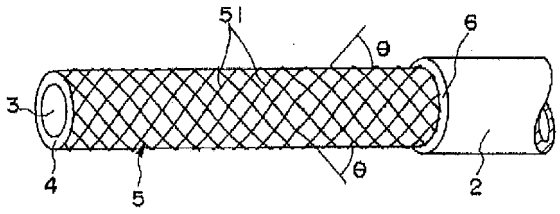
(54)【発明の名称】　留置針および留置針組立体

(57)【要約】

【課題】適度な柔軟性を確保しつつ、耐破損性、耐キンク性および先端加工性に優れる留置針本体を備えた留置針を提供すること。

【解決手段】本発明の留置針は、生体への穿刺時に内針を挿通して使用される外針を構成するもので、可撓性を有する留置針本体２を有する。留置針本体２は、内管４と外管６とを有し、これらが補強材層５を介して接合された構造をなしている。補強材層５は、好ましくは熱可塑性樹脂よりなる線状体５１を格子状に形成したものである。この格子状の線状体５１は、内管４の外周に、１本または２本以上の線状体５１をそれぞれ異なる２方向に螺旋状に巻き付けることにより形成することができる。



PATENT ABSTRACTS OF JAPAN

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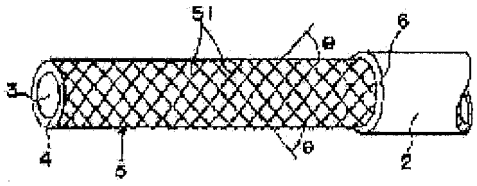
(54) INTRAVENOUS CANNULA AND INTRAVENOUS CANNULA ASSEMBLY

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an intravenous cannula having an intravenous cannula body which is excellent in failure resistance, kink resistance and front end workability while assuring adequate flexibility.
SOLUTION: This intravenous cannula is used to constitute an outside needle inserted into an inside needle and is used at the time of stinging to a living body and has the intravenous cannula body 2 having flexibility. The intravenous cannula body 2 has an inside tube 4 and an outside tube 6 and is constituted by joining these tubes via a reinforcing material layer 5. The reinforcing material layer 5 is constituted by forming wire-shaped bodies 51 preferably consisting of thermoplastic resins to a grid form. These grid-form wire-shaped bodies 51 may be formed by spirally winding one or ≥2 pieces of the wire-shaped bodies 51 around the outer periphery of the inside tube 4 in respectively different two directions.



CLAIMS

[Claim(s)]
[Claim 1]A detention needle, wherein it has a tubular detention hook body which has flexibility and a reinforcing material layer is laid under the inside of said detention hook body.
[Claim 2]A detention needle which an inner tube and an outer tube are provided with a detention hook body which has the portion joined via a reinforcing material layer, and is characterized by things.
[Claim 3]The detention needle according to claim 2 which comprises material in which either [at least] said inner tube or said outer tube has flexibility.
[Claim 4]The detention needle according to claim 3 whose material which has said flexibility is thermoplastic elastomer.
[Claim 5]The detention needle according to claim 4 in which said thermoplastic elastomer is a polyamide elastomer.
[Claim 6]The detention needle according to any one of claims 1 to 5 with which said reinforcing material layer comprises a line object.
[Claim 7]The detention needle according to any one of claims 1 to 5 with which said reinforcing material layer forms a line object in linear shape along with a longitudinal direction of a swirl, the shape of a lattice, or said detention hook body.
[Claim 8]The detention needle according to claim 6 or 7 whose angle of gradient [as opposed to an axis of said detention hook body in said line object] theta is 0-70 degrees.
[Claim 9]The detention needle according to any one of claims 6 to 8 which has a portion from which allocation density of said line object differs.
[Claim 10]The detention needle according to any one of claims 6 to 9 with which said line object comprises thermoplastics.
[Claim 11]The detention needle according to any one of claims 6 to 10 with which said line object comprises polyamide system resin.
[Claim 12]The detention needle according to any one of claims 1 to 11 whose area ratio which said reinforcing material layer in a cross section of said detention hook body occupies is 0.1 to 30%.
[Claim 13]A detention needle assembly comprising:
The detention needle according to any one of claims 1 to 12.
An inner needle inserted inside said detention needle.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the detention needle and detention needle assembly which are used, for example in the case of an infusion solution or blood transfusion detaining in a blood vessel.
[0002]
[Description of the Prior Art]When performing an infusion solution etc. to a patient, the detention needle assembly which comprises a detention needle (outer needle) and an inner needle is used. This detention needle assembly is making the double needle structure where the inner needle was inserted in in the detention needle (outer needle).
Where a detention needle and an inner needle are unified, a puncture is carried out to an artery or a vein, extraction of the inner needle is carried out after that, it leaves only a detention needle in the living body, and it is detained.

[0003]The inner needle of a detention needle assembly comprises a metallic material like stainless steel, and the sharp edge of a blade (needle tip) is formed at the tip. Therefore, an inner needle can be got damaged and shaved to a detention needle to a detention needle by the edge of a blade sharp insertion or when carrying out extraction, it is divided, and there is a possibility of doing breakage of a crease, exfoliation, a fracture, etc. The thing in particular that breakage of such a detention needle produces during detention to a living body is not preferred.
[0004]Therefore, moderate intensity and breakage-proof nature are required of a detention needle. While kink-proof nature is required as bending (kink) not arising by the curved part of a blood vessel, a crookedness part, etc., in order to carry out tip processing at the tip shape which can perform the puncture to a living body advantageously, the tip processability at the time of manufacture is needed for a detention needle.
[0005]However, pliability moderate in order to secure the flattery nature to the curved part of a blood vessel and a crookedness part is required for a detention needle at one side, and since the flexible raw material is used, there is a fault that breakage-proof nature and kink-proof nature are inferior.
[0006]Thus, since the conventional detention needle comprised a single material, it was not able to satisfy the aforementioned various characteristics demanded simultaneously.
[0007]
[Problem(s) to be Solved by the Invention]There is the purpose of this invention in providing the detention needle and detention needle assembly which are excellent in breakage-proof nature, kink-proof nature, and tip processability, securing moderate pliability.
[0008]
[Means for Solving the Problem]Such a purpose is attained by this invention of following the (1) - (13).
[0009](1) A detention needle, wherein it has a tubular detention hook body which has flexibility and a reinforcing material layer is laid under the inside of said detention hook body.
[0010](2) A detention needle which an inner tube and an outer tube are provided with a detention hook body which has the portion joined via a reinforcing material layer, and is characterized by things.
[0011](3) A detention needle given in the above (2) which comprises material in which either [at least] said inner tube or said outer tube has flexibility.

[0012](4) A detention needle given in the above (3) whose material which has said flexibility is thermoplastic elastomer.
[0013](5) A detention needle given in the above (4) in which said thermoplastic elastomer is a polyamide elastomer.
[0014](6) The above (1) by which said reinforcing material layer is constituted from a line object thru/or a detention needle given in either of (5).
[0015](7) The above (1) as for which said reinforcing material layer forms a line object in linear shape along with a longitudinal direction of a swirl, the shape of a lattice, or said detention hook body thru/or a detention needle given in either of (5).
[0016](8) The above (6) whose angle of gradient [as opposed to an axis of said detention hook body in said line object] theta is 0-70 degrees, or a detention needle given in (7).
[0017](9) The above (6) which has a portion from which allocation density of said line object differs thru/or a detention needle given in either of (8).
[0018](10) The above (6) by which said line object is constituted from thermoplastics thru/or a detention needle given in either of (9).
[0019](11) The above (6) by which said line object is constituted from polyamide system resin thru/or a detention needle given in either of (10).
[0020](12) The above (1) whose area ratio which said reinforcing material layer in a cross section of said detention hook body occupies is 0.1 to 30% thru/or a detention needle given in either of (11).
[0021](13) A detention needle assembly provided with a detention needle the above (1) thru/or given in either of (12), and an inner needle inserted inside said detention needle.
[0022]
[Embodiment of the Invention]Hereafter, the detention needle and detention needle assembly of this invention are explained in detail based on the good example shown in an accompanying drawing.
[0023]the top view in which drawing 1 shows the example of composition of the detention needle assembly of this invention, and drawing 2 expand and show the composition near the center section of the detention needle shown in drawing 1 -- it is a notch sectional view in part. By drawing 1, in order to understand easily, especially the diameter direction of a detention needle is expanded and it is shown typically.
[0024]As shown in drawing 1, the detention needle 1 of this invention is made to go away in order that only a pair may equip the hub 8 with the detention hook body 2, the hub 8 with which the base end 21 of this detention hook body 2 was equipped, and the base end 21 of the detention hook body 2 in total, and comprises the pin 7.
[0025]As for the detention hook body 2, the lumen 3 is formed in the inside covering the overall length. This lumen 3 serves as a channel of fluids, such as a drug solution. When carrying out the puncture of the detention needle 1 to a blood vessel, the inner needle main part 91 of the inner needle 9 mentioned later is inserted into this lumen 3, and it unites with the detention needle 1.
[0026]The inside is open for free passage with the end face of the lumen 3, and the hub 8 functions as regio oralis for pouring in fluids, such as a drug solution, into the lumen 3, or extracting blood. The hub 8 functions also as a grasping part at the time of operating the detention needle 1.
[0027]The caulking pin 7 is a metal tubular member, and the expanding part is formed in the end face. By inserting this caulking pin 7, the base end 21 of the detention hook body 2 is stuck to the tip side inner skin of the hub 8 by pressure (closed), and is fixed firmly.
[0028]the metal inner needle main part 91 which has the edge of a blade (needle tip) 92 with the inner needle 9 sharp at a tip -- among these, it comprises the hub 10 with which the base end of the hook body 91 was equipped (adherence). the hub 10 -- the inside of the hub 8 -- desirable -- liquid -- it can fit in densely. The detention needle assembly of this invention comprises such the inner needle 9 and the detention needle 1.
[0029]The internal structure of the detention hook body 2 is shown in drawing 2.By drawing 2, in order to understand easily, especially the diameter direction of the detention needle 1 is expanded, and it is shown typically.
[0030]As shown in drawing 2, the detention hook body 2 has the inner tube 4 and the outer tube 6, and is making the structure where these were joined via the reinforcing material layer 5 which is an interlayer. Both sides comprise material of the inner tube 4 and the outer tube 6 which has flexibility (pliability)

preferably at least on the other hand.
[0031]As a component of the inner tube 4 and the outer tube 6, respectively For example, polypropylene, Polyolefines, such as polyethylene and an ethylene-vinylacetate copolymer, Polyester, such as polyamide, polyethylene terephthalate, and polybutylene terephthalate, Fluororesin, such as polyurethane, polyvinyl chloride, polystyrene system resin, and an ethylene-tetrafluoroethylene copolymer, It is usable in various thermoplastic elastomer, such as a polyamide elastomer, a polyester elastomer, a polyurethane elastomer, a polystyrene elastomer, and a fluorinated elastomer, or the thing which combined two or more among these.
[0032]From the point of excelling in anti-thrombus nature, a moldability, processability, economical efficiency, etc., thermoplastic elastomer is preferred and especially a polyamide elastomer is [among these] preferred.
[0033]With a polyamide elastomer, here, for example Nylon 6, the nylon 64, Nylon 66, Nylon 610, Nylon 612, Nylon 46, the nylon 9, Nylon 11, Nylon 12, N-alkoxy methyl conversion nylon, The various aliphatic series or aromatic polyamide like hexamethylenediamine isophthalic acid polycondensation polymer and METAKISHI roil diamine adipic acid polycondensation polymer is used as a hard segment, The block copolymer which uses polymer, such as polyester and polyether, as a soft segment is typical, In addition, they are a polymer alloy (a polymer blend, graft polymerization, random polymerization, etc. are included) of said polyamide and resin which is rich in pliability, the thing which elasticity-ized said polyamide with the plasticizer etc., and a concept also containing these mixtures further. The component of the inner tube 4 and the outer tube 6 may be the same, or may differ.
[0034]When the component of the inner tube 4 and the outer tube 6 is the same or different, as for the hardness of the material used for the outer tube 6, it is preferred that the Shore D hardness is 30 to about 80, and it is more preferred that it is 40 to about 70. By considering it as such hardness, intensity and pliability with the moderate detention hook body 2 can be secured, and the more outstanding breakage-proof nature and kink-proof nature are obtained.
[0035]Since it is the same, as for the hardness of the material used for the inner tube 4, it is preferred that the Shore D hardness is 30 to about 80, and it is more preferred that it is 40 to about 70.
[0036]Although the thickness in particular of the inner tube 4 and the outer tube 6 is not limited, as for the thickness of the inner tube 4, about 0.02-0.10 mm is preferred, about 0.02-0.07 mm is more preferred, as for the thickness of the outer tube 6, about 0.02-0.10 mm is preferred, and its about 0.03-0.08 mm is more preferred.
[0037]In the composition of a graphic display, although the inside diameter and outer diameter of the inner tube 4 and the outer tube 6 are constant respectively, these may change selectively along with the longitudinal direction of the detention hook body 2, respectively. For example, they may be the composition which has a portion which the inside diameter of the inner tube 4 increases gradually toward the direction of a tip, and the composition which the outer diameter of the inner tube 4 or the outer tube 6 dwindles toward the direction of a tip in the tip part 22 of the detention hook body 2.
[0038]The reinforcing material layer 5 is installed in the boundary part of the above inner tubes 4 and the outer tubes 6. Here, although the shape in particular of the reinforcing material layer 5 is not limited, what formed a line object, a sheet like body, etc. continuously, the thing formed in fragments, etc. are mentioned. What formed the line object continuously especially is preferred. The lateral cross sectional shape in particular of a line object is not limited, but is preferred, and is preferred. [of especially the line object of a round shape] [of the shape of a round shape, an ellipse form (the shape of band-like is also included), a triangle, a quadrangle, or a star shape]
[0039]Drawing 3, drawing 4, and drawing 5 are the perspective views showing the example of composition of the reinforcing material layer 5, respectively.
[0040]The reinforcing material layer 5 comprises the line object 51. That is, in the example shown in drawing 3, the reinforcing material layer 5 forms the line object 51 in the shape of a lattice. The line object 51 of the shape of this lattice can be formed in the periphery of the inner tube 4 by twisting spirally 1 or the two line objects 51 or more around a 2-way different, respectively.
[0041]In the example shown in drawing 4, the reinforcing material layer 5 forms the line object 51 spirally. This spiral line object 51 can be formed in the periphery of the inner tube 4 by twisting 1 or the two line objects 51 or more in the one direction in a predetermined pitch.
[0042]In the example shown in drawing 5, the reinforcing material layer 5 forms the two or more line objects

51 in linear shape along with the longitudinal direction of the detention hook body 2.
[0043]What combined suitably what is shown in drawing 3 - drawing 5 may be sufficient as the pattern of the line object 51, and they may be things other than what is shown in drawing 3 - drawing 5 further.
[0044]Covering the overall length of the detention hook body 2, even if the allocation density of the line object 51 is uniform, it may have a different portion. For example, allocation density of the line object 51 in the portion (example: base end 21) which is going to improve rigidity more can be made high, or allocation density of the line object 51 in the portion (example: tip part 22) which is going to improve pliability more can be made low.
[0045]With the composition shown in drawing 3 and drawing 4, adjustment of such allocation density of the line object 51. It can carry out by adjusting the pitch (interval between the adjoining line objects 51) of the line object 51 rolled spirally, a number, and at least one condition in the angle of gradient theta mentioned later, and can carry out by changing the allocation number of the line object 51 in the composition shown in drawing 5.
[0046]Not only when such a reinforcing material layer 5 is allocated covering the overall length of the detention hook body 2, but the detention hook body 2 may have a portion in which the reinforcing material layer 5 is not allocated. For example, it can have composition in which the reinforcing material layer 5 is allocated by the portion except the tip part 22 of the detention hook body 2, and composition in which the reinforcing material layer 5 is allocated by the portion except the base end 21 of the detention hook body 2.

[0047]As long as it has the rigidity which is a grade from which sufficient breakage-proof nature (especially sectility-proof) for the detention hook body 2 and kink-proof nature are obtained as a component of the line object 51 which forms the reinforcing material layer 5, what kind of thing may be used, but thermoplastics is preferred. What has the thermoplasticity in which melting or softening is possible with that heating on the occasion of tip processing by heating at the time of forming the tip part 22 of the detention hook body 2 in desired shape (for example, tapered shape as shown in drawing 1) as this thermoplastics is preferred.
[0048]As such a material, for example Polyethylene terephthalate (PET), Polyester like polybutylene terephthalate (PBT), polyethylene, Polyolefine like polypropylene, rigid polyvinyl chloride, polyamide, Polyimide, polyamidoimide, polystyrene, thermoplastic polyurethane, Polycarbonate, ABS plastics, an AS resin, an acrylic resin, polymethylmethacrylate (PMMA), Polyacetal (PA), polyarylate, polyoxymethylene (POM), High tension polyvinyl alcohol, a fluoro-resin, polyvinylidene fluoride (PVdF), Polytetrafluoroethylene, an ethylene-vinyl acetate saponification thing (EVOH), Polysulfone, polyether sulphone, polyether ketone, a polyether ether ketone, Polyphenylene oxide, a polyphenylene sulfide, a liquid crystal polymer, Or polyamide system resin which a polymer alloy including either of these or the thing which combined two or more [of these] is mentioned, and is mainly concerned with polyamide or polyamide especially also in this is preferred.
[0049]With polyamide, here, for example Nylon 6, the nylon 64, Nylon 66, Nylon 610, Nylon 612, Nylon 46, the nylon 9, Nylon 11, Nylon 12, N-alkoxy methyl conversion nylon, The various aliphatic series or aromatic polyamide like hexamethylenediamine isophthalic acid polycondensation polymer and METAKISHI roil diamine adipic acid polycondensation polymer is typical, In addition, they are the polymer alloys (a polymer blend, graft polymerization, random polymerization, etc.) of said polyamide and other resin, and a concept which also contains these mixtures further.
[0050]Although any of the aggregate (for example, thing which twisted the single fiber) of the single fiber by the material of the above-mentioned illustration, etc. or textiles may be sufficient as the line object 51, it is preferred. [of the point that the processability of said tip processing to the tip part 22 is better to a single fiber]
[0051]The thickness (diameter) of the line object 51 is suitably determined by a relation with the component. That is, a required and sufficient reinforcing effect and pliability shall be acquired to the detention hook body 2, and it shall be a grade with the good processability of tip processing of the tip part 22. For example, as for the diameter, in the case of what the line object 51 depends on a polyamide single fiber, it is preferred to be referred to as about 20-50 micrometers. Even if the line object 51 is single and it uses it, where two or more are bundled, it may be used.
[0052]Since the tip part 22 of the detention hook body 2 may be processed into tapered shape by heat-

treatment, or it may be beforehand processed in the shape of a trumpet by heat-treatment in order to insert the caulking pin 7 in the base end 21 of the detention hook body 2 as mentioned above, In this case, as for the line object 51 (component of the reinforcing material layer 5), melting or softening are preferred.
[0053]Therefore, when melting temperature (it is the average value when both differ) of T_1, the inner tube 4, and the outer tube 6 is made into T_2 for the melting temperature (melting point) of the line object 51 (component of the reinforcing material layer 5), It is preferred that T_1-T_2 is 60 ** or less, it is more preferred that it is 30 ** or less, and it is still more preferred that it is $T_1<=T_2$. When satisfying such a relation, the more outstanding processability is obtained in the aforementioned processing.
[0054]When enough low compared with T_2 and T_1 twists the line object 51 around the peripheral face of the inner tube 4 continuously in the manufacturing process of the detention hook body 2, melting or softening have the line object 51. In this case, the reinforcing material layer 5 will comprise melting or the line object 51 in the state where it softened. The fused line object 51 will produce adhesive strength with the inner tube 4 or the outer tube 6, and the line object 51 will become difficult to secede from a catheter section, and the reinforcing effect of the detention hook body 2 will be heightened.
[0055]As for the angle of gradient (only henceforth a "angle of gradient") theta to the axis of the detention hook body 2 of the line object 51, it is preferred that it is 0-70 degrees, and it is more preferred that it is 15-60 degrees. Here, theta= 0 degree of the states (state where the line object 51 has been arranged at the axis of the detention hook body 2 and parallel) which show in drawing 5 are shown. The kink-proof nature and flattery nature in which the detention hook body 2 was more excellent in the angle of gradient theta being this range are demonstrated.
[0056]Covering the overall length of the reinforcing material layer 5, even if this angle of gradient theta is the same, it may have a portion from which the angle of gradient theta differs along with the longitudinal direction of the detention hook body 2, respectively.
[0057]In the above reinforcing material layers 5 and the reinforcing material layer 5 especially with the line object 51, it is preferred that the area ratio which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies is about 0.1 to 30%, it is more preferred that it is about 0.5 to 25%, and it is still more preferred that it is about 3 to 20%. When this area ratio is too low, depending on the component of the reinforcing material layer 5, or the component of the inner tube 4 and the outer tube 6. A reinforcing effect becomes insufficient, and when an area ratio is too high, the flexural rigidity of the detention hook body 2 may become depending on the component of the reinforcing material layer 5, or the component of the inner tube 4 and the outer tube 6, become large too much, and insufficient [pliability].
[0058]As mentioned above, by having the reinforcing material layer 5 and the reinforcing material layer 5 especially with the line object 51 in the detention hook body 2 in the detention needle 1 of this invention, Securing moderate pliability to the detention hook body 2, the outstanding breakage-proof nature (get damaged and delete, and divide and lack tolerance over breakage of a crease, exfoliation, cutting, a fracture, etc.) and kink-proof nature are demonstrated, and the outstanding tip processability in processing of the tip part 22 is demonstrated by selection of the component of the reinforcing material layer 5.
[0059]The portion which the detention needle of this invention does not have a boundary (distinction) of the inner tube 4 and the outer tube 6 unlike the composition of a graphic display, or is equivalent to an indefinite thing and the inner tube 4, and the portion equivalent to the outer tube 6 may be unified.
[0060]Next, the good example of the manufacturing method of the detention needle 1 is explained. first, a law -- the inner tube 4 is manufactured in accordance with a method. This inner tube 4 can be manufactured, for example by extrusion molding.
[0061]Next, the line object 51 is spirally twisted around the peripheral face of the inner tube 4. this -- twisting -- it can carry out using the device (not shown) called a spiral machine, for example. It lets out the line object 51 from the line object feed zone of a spiral machine, on the other hand, while moving the inner tube 4 to the shaft orientations to said line object feed zone, it rotates focusing on the axis, and the line object 51 is continuously twisted around the peripheral face of the inner tube 4, and it goes to it.
[0062]If reverse the move direction of the inner tube 4, without changing the hand of cut of the inner tube 4, or it returns to the start edge of the inner tube 4, the move direction of the inner tube 4 is made into a uniform direction and the hand of cut of the inner tube 4 is made into an opposite direction after reaching

the termination of the inner tube 4, the line object 51 of the shape of a lattice as shown in drawing 3 can be formed.
[0063]Although it is considered as the move mode which the inner tube 4 rotates and moves to shaft orientations above, In order that not only this but the inner tube 4 and a line object feed zone may rotate relatively and may just move to inner-tube shaft orientations relatively, For example, a method which the ** inner tube 4 rotates and a line object feed zone moves to the shaft orientations of an inner tube, ** While the inner tube 4 moves to shaft orientations, the method and the ** inner tube 4 which a line object feed zone rotates to the circumference of the periphery of an inner tube are fixed and a line object feed zone rotates to the circumference of the periphery of the inner tube 4, they may be the method of moving to inner-tube shaft orientations, or the method which combined these suitably.
[0064]The periphery will be covered with the outer tube 6 if the reinforcing material layer 5 is formed in the peripheral face of the inner tube 4 as mentioned above. Junction of the outer tube 6 is made as [stick / with the peripheral face of the inner tube 4, and the line object 51 / the inner skin of the outer tube 6].
[0065]How to paste up the (a) outer tube 6 with adhesives or a solvent as the method, for example, (b) Heat the method and the (c) outer tube 6 which are welded to inner-tube 4 grade (for example, thermal melting arrival, high frequency weld), or make it swell using a solvent, The inner tube 4 is inserted into the outer tube 6, and the method of making the peripheral face of inner-tube 4 grade laminate the method of shrinking the outer tube 6, (d) melting, or the outer-tube component that liquefied by dipping, coating, etc., making it solidify by cooling or desiccation (desolvation treatment), and forming the outer tube 6, etc. are mentioned after that.
[0066]Thus, the layered product of the obtained inner tube 4, the reinforcing material layer 5, and the outer tube 6 is cut by predetermined, and performs further processing of the tip part 22 and the base end 21 which were mentioned above if needed. Thereby, the detention hook body 2 is completed.
[0067]Thus, the caulking pin 7 is inserted in the base end 21 of the obtained detention hook body 2, it equips with the hub 8 further, and the detention needle 1 is completed.
[0068]It cannot be overemphasized that the composition and the manufacturing method of the detention needle 1 of this invention are not limited to what was mentioned above. Especially the composition of each part of the detention needle 1 can be replaced by the thing of arbitrary composition of that a function can be exhibited similarly.
[0069]The detention hook body in the detention needle 1 of this invention may have other layers, such as an enveloping layer formed for the purpose that it is arbitrary in addition to said inner-tube 4, reinforcing material layer 5, and outer-tube 6, and an interlayer. For example, a protective layer, an anti-thrombus layer, a lubricating layer, an abrasion proof layer, etc. can be formed in the inner skin of the inner tube 4, or the peripheral face of the outer tube 6, or an interlayer like an adhesives layer can be provided in the arbitrary parts between the inner tube 4 and the outer tube 6.
[0070]
[Example]Hereafter, the concrete example of the detention needle of this invention is described.
[0071](Example 1) It manufactured by the method which mentioned above the detention needle of composition of being shown in drawing 1, drawing 2, and drawing 3. The conditions of each part are as follows.
[0072]Using the spiral machine, to the line object feed zone (immobilization), it rotated and manufacture of the reinforcing material layer 5 went while moving the inner tube 4 to the shaft orientations.
[0073]Processing (tip processing) which makes the tip part 22 tapered shape was performed by inserting the end of the detention hook body 2 in a metallic mold (die temperature: 220 **).
[0074]Extrusion molding performed formation of the inner tube 4, and formation of the outer tube 6 made the peripheral face of the inner tube 4 in which the reinforcing material layer 5 was formed laminate the outer-tube component of a molten state with an extrusion coat mold, and was performed by cooling this and solidifying.
[0075]overall-length [of a detention hook body]: -- outer diameter [of the 32 mm outer tube 6]: -- outer diameter [of the 0.86 mm inner tube 4]: -- inside diameter [of the 0.75 mm inner tube 4]: -- component [of the 0.64 mm outer tube 6]: -- a polyether aromatic polyamide copolymer (PEO-NyM12) (melting point T_2:185 ** and Shore D hardness:55)

[0076]component [of the inner tube 4]: -- composition [of the same reinforcing material layer 5 as the outer tube 6]: -- the line object 51 -- the shape of a lattice -- formation (state shown in drawing 3) formation area [of the reinforcing material layer 5]: -- the detention hook body 2 -- almost -- component [of the overall-length line object 51]: -- the single fiber of polyamide (nylon 6, melting point T_1:210 **)

[0077]The number of the diameter:41micrometer angle-of-gradient line object 51 of theta:45 degrees which is the line object 51: Area ratio:17.3% which the reinforcing material layer 5 in the cross section of 24 detention hook body 2 occupies [0078](Example 2) The same detention needle as Example 1 was manufactured except having made into 36 the number of the line object 51 which constitutes the reinforcing material layer 5. The area ratio which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 25.9%.

[0079](Example 3) The number of the line object 51 which constitutes the reinforcing material layer 5 was made into one, and the same detention needle as Example 1 was manufactured except having rolled this spirally and having formed it with the angle of gradient of theta= 15 degrees (state shown in drawing 4). The area ratio which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 0.5%.

[0080](Example 4) The number of the line object 51 which constitutes the reinforcing material layer 5 was made into six, and the same detention needle as Example 1 was manufactured except having rolled this spirally and having formed it with the angle of gradient of theta= 15 degrees (state shown in drawing 4). The area ratio which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 3.2%.

[0081](Example 5) In the tip part 22 of the detention hook body 2, while considering it as the angle of gradient of theta= 65 degrees of the line object 51, the spiral pitch was made small, and the same detention needle as Example 1 was manufactured except having made allocation density of the line object 51 in this tip part 22 higher than other portions. The area ratio (average value of the tip part 22 and other portions) which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 28.9%.

[0082](Example 6) In the tip part 22 of the detention hook body 2, while considering it as the angle of gradient of theta= 60 degrees of the line object 51, the spiral pitch was made small, and the same detention needle as Example 4 was manufactured except having made allocation density of the line object 51 in this tip part 22 higher than other portions. The area ratio (average value of the tip part 22 and other portions) which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 6.1%.

[0083](Example 7) The same detention needle as Example 1 was manufactured except having arranged a total of 36 line objects 51 at equal intervals in parallel along with the longitudinal direction of the detention hook body 2 as the reinforcing material layer 5 to the peripheral face of the inner tube 4 (the state, angle of gradient of theta= 0 degree which are shown in drawing 5). The area ratio which the reinforcing material layer 5 in the cross section of the detention hook body 2 occupies was 18.3%.

[0084](Comparative example) The same detention needle as Example 1 was manufactured except not forming the reinforcing material layer 5.

[0085]The kink-proof nature, the breakage-proof nature, and the tip processability of the detention hook body 2 were measured by the following methods to each detention needle of said Examples 1-7 and a comparative example. A measurement result is shown in the following table 1.

[0086]The existence of crease (kink) generating of 50 times repetition bending and the detention hook body 2 at that time was investigated for the <measurement of kink-proof nature> detention hook body 2 at 90 degrees with the curvature radius of 5 mm. The result is shown in the following table 1. Measurement was performed to 20 detention hook bodies.

[0087]Pull the detention hook body 2 to the shaft orientations straightly, they were made to fracture it the speed for <measurement of breakage-proof nature> 300-mm/, and the load at the time of a fracture (tensile strength) was measured. The result is shown in the following table 1. Measurement was performed to 20 detention hook bodies under a room temperature and constant temperature (20 **) (37 ** (near body temperature)), respectively, and average value was calculated.

[0088]The three-stage of A, B, and C estimated the ease of processing in the case of the <evaluation of tip processability> aforementioned tip processing in order with high ease.

[0089]
[Table 1]

表 1

	折れ発生頻度 [本/本]	破断荷重 [kg]		先端加工性
		室温（20℃）下	恒温（37℃）下	
実施例1	0/20	2．9	2．2	A
実施例2	0/20	3．7	2．9	A
実施例3	0/20	1．4	1．0	A
実施例4	0/20	1．9	1．4	A
実施例5	0/20	2．3	1．7	A
実施例6	0/20	1．6	1．2	A
実施例7	0/20	4．7	3．7	A
比較例	9/20	1．2	0．6	A

[0090]With the detention needle of Examples 1-7, each is excellent in the kink-proof nature, the breakage-proof nature, and the tip processability of a detention hook body as shown in Table 1. On the other hand, in the detention needle of the comparative example, since it does not have a reinforcing material layer, kink-proof nature and breakage-proof nature are inferior.
[0091]
[Effect of the Invention]As stated above, breakage-proof nature and kink-proof nature can be improved sufficient intensity being obtained and securing moderate pliability to a detention hook body as a result by having provided the reinforcing material layer in the detention hook body, according to the detention needle and detention needle assembly of this invention.
[0092]When a reinforcing material layer is especially constituted from a line object, kink-proof nature and flattery nature further outstanding with the detention hook body can be obtained by being easy to adjust the pliability and the reinforcing effect of a detention hook body with conditions, such as the allocation density, moderately, and setting the angle of gradient of a line object as the range of desired. It is also the same as when the area ratio which the reinforcing material layer in the cross section of a detention hook body occupies is set as the range of desired.
[0093]When the line object comprises thermoplastics like polyamide system resin, the line object of melting or processability [in / it softens and / the tip processing] improves at the time of thermoforming of the tip part of a detention hook body. The improvement in such processability of tip processing contributes also to prevention of breakage of a detention hook body.

[Translation done.]